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Immune Bodies and Biological Reactions*

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The study of immunity during the last few years has advanced to an extent that not only has our theoretical knowledge of the subject been furthered, but also its practical usefulness has been established beyond a doubt. The progress in this line has not been confined only to the application of the present knowledge of immunity to the science of human medicine, but some of the reactions are now utilized in veterinary medicine. Furthermore, this advanced knowledge was gained principally through the work with blood serum of immunized animals, and therefore it is of the utmost importance that the up-to-date, progressive veterinarian should be familiar with at least the principal discoveries on immunization as they are applied at the present time in veterinary medicine.

The wonderful progress which has been made in our knowledge of immunity and serology in its practical application gives the scientific world great advantages at the present time in the determination of conditions, for which heretofore there were no satisfactory methods of establishing accurate diagnoses. The practical applications as the

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result of the studies in immunity can be readily appreciated by the extensive use of these methods at the present time. I wish to refer only to its use in the diagnosis of infectious diseases, to the identification and differentiation of pathogenic bacteria, for the determination of origin and nature of various proteids, beside the wonderful results which are obtained in the determination of the origin of blood samples and meats, which is of great advantage from the standpoint of forensic medicine.

One can favorably compare the work which has been carried out in the study of immunity in the last ten years with the work of thirty years ago in bacteriology started by Koch, but inasmuch as in the earlier studies of bacteriology, the literature containing reports of the important investigations in that study were more or less limited, on the other hand, at the present time the published results in the numerous special publications on serology and immunity are so manifold that it is difficult even for the specialist to keep informed on all phases of this subject. The veterinarian, through the limited publications in the English literature, is somewhat at a disadvantage to keep up with the progress of recent work in these lines, and therefore, I deem it advisable to take up briefly the most important reactions which are employed more or less in the practice of animal diseases.

While it is not expected that the biological reactions which are employed in veterinary practice could be carried out by the practitioner, nevertheless, it is necessary for him to be familiar with the progress of the work in the veterinary line, in order that he may take advantage of this advanced knowledge when he is confronted with conditions requiring the application of any of these biological reactions. The work proper will always be confined to laboratories, inasmuch as the delicacy and accuracy of the work necessitates specialization in these lines.

THE PRINCIPLES OF IMMUNITY.—Immunity is the resistance of an organism against infectious disease. This may be either natural, the animal being born with it, or acquired as a result of recovery from a disease, or by artificial means. The acquired immunity is produced by the entrance of the infective agent stimulating the body to the production of antibodies (immune bodies). In such cases the body itself produces the antibodies in an active form. Accordingly, this represents an immunity which is known as active immunity. On the other hand, if the immune bodies of an actively immune animal are introduced into another animal, a passive immunity is produced. Active immunity develops only after one or two weeks, while passive immunity is established immediately after the inoculation, but the passive immunity does not last and protect animals for a long period, as it usually vanishes as quickly as the immunity developed. This is due to the fact that just as soon as the injected immune bodies are eliminated from the animal organism, immunity will cease. However, in the active form of immunity, the stimulation of the infection causes the continuous development of antibodies (immune bodies), and therefore a lasting immunity is produced.

From these brief remarks it can readily be seen that the production of active immunity whenever its employment is practicable has a great advantage over a passive immunity, and the tendency is to employ this method of immunization whenever possible. On the other hand, it becomes frequently necessary to employ means by which the spread of a disease should be immediately checked, and of course, in such instances, the passive immunity has the advantage over active immunity, inasmuch as it affords the animals immediate protection against infection (in many instances it exerts also a curative action). Frequently, however, both methods are used as a combined inoculation by which the animal is given immediate and also a lasting protection against infectious diseases. This form of immunization is known as the "simultaneous method." This method was first employed by Lorenz in swine erysipelas. Later it was employed by Kolle and Turner in rinderpest, by Sobernheim in anthrax, and by Dorset in hog cholera.

The object of the immunization is to stimulate with the material used for the immunization the production of antisubstances which have not been previously in the body or only in very small quantities. These are the antibodies or immune bodies, and the substances which stimulate the body for the production of such immune bodies are known as antigens.

In taking up this subject it would be impossible for me to discuss all its important phases, therefore I will confine myself to those which are of particular interest to the veterinarian; thus, I will discuss briefly the phenomena of toxins, antitoxins, agglutinins, precipitines, lysins (bacteriolysins, hemolysins, cytolysins), complement fixation, opsonins, and anaphylaxis.

Toxins and Antitoxins.—Toxins are soluble metabolic or secretory products of vegetable or animal origin; in the body they are assimilated by the protoplasm of the cells, whereby they exert a poisonous effect on the same. Toxins stimulate the production of antitoxins, and only substances which tend to the production of antitoxin are toxins.

Ordinary poisons are not assimilated by the protoplasm, they are stored in the cells without causing any synthetic process, while bacterial toxins are anchored in the cells. The illustration of Wassermann is quite characteristic of the difference between toxins and the ordinary poisons, when he compares them with sugar and saccharins. Both substances are sweet, but the saccharine is not assimilated by the cells, while the sugar is.

The chemical composition of toxins is yet unknown, however, investigations have disclosed some of their physical and biological characteristics. The most important are: that most toxins are destroyed at a temperature of 60° C., they are sensitive toward the influence of light, after long standing their toxic effect diminishes. The toxicity of the various toxins also differs, as, for instance, it requires only a remarkably small quantity of tetanus toxins to produce tetanus, while with some of the other bacterial poisons, toxic effects are produced only

with larger quantities. Gastric juice destroys most of the toxins, and therefore the majority of toxins taken per os are ineffective. They exert their toxic influence usually after several days of incubation.

The toxins are readily obtained from ordinary cultures; however, bouillon cultures are best adapted for their production. The bacteria multiply, and at the same time secrete their toxins into the bouillon. All that is then necessary is to filter the culture. The filtrate thus obtained represents the toxin. This can be preserved and kept for a considerable length of time under suitable conditions. The preparation of toxins of anaerobic bacteria is not quite as simple, inasmuch as the bacteria have to be cultivated with the exclusion of air. The toxins may also be concentrated, and thereby they may be even prepared in powdered form. Tetanus toxin in the powdered form will keep over a year without losing any of its virulence, and one can readily see the advantage of such a method of preservation when it is considered that in the standardization of tetanus antitoxins a uniformly virulent toxin is at our command.

Antitoxins are produced only by the specific action of a toxin on the susceptible cells, and accordingly the toxins which have no affinity for the cells of certain species of animals will not exert the production of antitoxin, irrespective of the quantity of toxins introduced into the body. Antitoxin, therefore, is a protective substance which acts against its corresponding toxin. When the toxin is introduced into a susceptible organism, the latter responds in the form of self-protection by the production of antibodies, that is antitoxins. Such a process follows usually either the artificial inoculation of the virus, or during the course of natural infection. The antibodies (antitoxins) thus produced will protect the animal from an attack of disease, and thereby active immunity s produced.

The production of the antitoxin can be readily explained by Ehrlich's side-chain theory, and while from time to time some investigators claim to doubt the applicability of this hypothetical theory, nevertheless, the progressive study of immunization and serology continues to strengthen the phenomenal conception of immunity exploited by Ehrlich.

Every toxin molecule consists of a non-poisonous (haptophore) and a poisonous (toxophore) atom group. On the other hand, the protoplasm of the cells consists of a vital nucleus and of numerous side-chains (receptors), of which some possess a special affinity towards the haptophore atom group of the toxin molecules. If molecules of the toxin enter the cells, they become anchored to the corresponding receptors of the cell-protoplasm by the haptophore atom group, and their toxophore atom group exerts a harmful effect on the vital nucleus of the cell. There follows either a total destruction of the cell protoplasm as a result of this combination or the stimulation of the cell protoplasm to a defensive action which is manifested by the continual production and elimination of the receptors in the blood. The presence of these free receptors in the blood of immunized animals explains the antitoxin

immunity, since these receptors are enabled to combine with the haptophore atom of the toxin molecule before it has had an opportunity to attack the cell protoplasm.

The mode of action of antitoxin was explained by Metchnikoff and by the French school in general, that an antitoxin acts on the cells, thereby rendering toxins ineffective. Ehrlich, on the other hand, asserts that the antitoxin exerts a chemical action on the toxin. It does not destroy it, but binds it, and as a result a new chemical compound develops.

Antitoxins which have proven effective in the practice of medicine are very few, and in most instances afford only a preventive protection; however, in some of the antitoxins the immune bodies are so numerous that a curative action is obtained from their injection. Of course, it is only natural that for therapeutic action, larger quantities are required than for prevention.

The various antitoxins are prepared by different methods, however; horses are usually used for the production of antitoxins, the principal reason being that the amount of antitoxin produced by a horse would far exceed the amount which could be obtained from other smaller animals. The methods usually followed consist in the injection of toxins into the horses first in an attenuated form, the attenuation being lessened until the toxins are injected in pure form. By that time the tolerance of the animal has been established to such an extent that it will resist the injection of considerable quantities of toxin without a marked reaction. The antitoxins are tested for their potency, and these tests vary in the different countries. Thus, for instance, in the United States tetanus antitoxin is standardized in accordance with a method recommended by the Public Health and Marine Hospital Service, and according to this an immunity unit is ten times the least amount of serum necessary to save the life of a 350-gram guinea pig for ninety-six hours against the official test dose of the standard toxin.

Antitoxins may be produced in a concentrated form, and, for instance, the powdered form of tetanus antitoxin is used for the dusting of wounds.

AGGLUTININS.—Gruber and Durham observed (1896) that the serum of patients affected with typhoid fever or cholera produced a peculiar change in the bouillon cultures of these organisms. This phenomena has been also observed in the serum of patients recovered from these diseases. The reaction is manifested by a clearing of the uniformly cloudy fluid which takes place after a few drops of the serum is added to the cultures of this bacteria. At first small granules, later flakes appear in these cultures, the flakes gradually sink to the bottom of the tube, and finally the fluid clears up entirely. At the same time when the fluid is examined under the microscope the uniformly distributed motile bacteria have clumped and become non-motile. This reaction has been also observed with the serum of artificially immune

animals, and it has been termed agglutination. According to Gruber the agglutination is the result of the production of antibodies by the animal organism as a result of the protection against the infection. These antibodies are known as agglutinines.

The agglutination does not destroy the bacteria, the clumped bacteria being still capable of multiplication; nevertheless, the cultures obtained from agglutinated bacteria differ somewhat from the ordinary cultures of these organisms. The principal difference consists in their tendency to form long threads, even in cases where the original bacteria are known to be of short rod-shapes.

The phenomena of the agglutination may be observed macroscopically in test tubes. A test fluid is made from the organism which is to be tested against the agglutinines present in the serum of an animal. The serum to be tested is diluted in desired proportions and placed in small test tubes to which then the test fluid of the representative organisms is added. The test fluid is usually made from washed cultures of the bacterium. In the presence of a positive reaction, a tenacious clumping of the organism is noted on the bottom of the test tube. In order to establish the presence or absence of the agglutination, it is always advisable to use controls in the execution of this test; namely, in a corresponding tube instead of using the serum to be examined, a known normal serum is used, and compared with the serum to be examined. Beside this macroscopical examination, the phenomena of agglutination may be also examined through a microscope in hanging-drop preparations. This consists in the accumulation of the motile bacteria into groups, at the same time the motile bacteria becoming non-motile. Here, also, will be noted the clearing up of the homogeneous fluid; this phenomena can be followed under the microscope. As a matter of fact, they can be much better controlled than in the macroscopical test. For the practical application, however, the macroscopical application of the agglutination test is in vogue. The agglutinines are not destroyed by heating to 50° C. and 60° C. However, at 70° C. they are inactivated. The agglutination reaction takes place much quicker in the incubator at 37° C. than at lower temperatures, and accordingly after the necessary dilutions are made, the racks are usually placed in the incubator. On the other hand, at the present time, in some of the agglutination tests, the process is hastened by centrifugalization, and this is particularly advantageous in the application of the agglutination test for the diagnosis of glanders. By the centrifugalization, the results are hastened so that usually they can be read in from one to two hours afterward.

Normal serum does in most instances also agglutinate, but the agglutination value is as a rule lower than is the case in the presence of the specific agglutinines. The agglutination value of normal serums varies toward the different specific organisms, and in the application of the agglutination test these conditions, of course, must be taken into consideration. Thus, it has been established that normal horse serum

will agglutinate at a value of 400, 600, or even up to 800, whereas the serum of glandered horses will agglutinate to 1000, 1500, 2000, or higher. The smallest quantity of serum which will produce agglutination is known as the agglutination titer.

The practical application of the agglutination test is employed, on the one hand, for the determination of questionable bacteria, by the action of a known specific serum against this bacteria; and on the other hand, for the determination of disease by the action of the suspected serum against the specific bacteria; for instance, serum of a glandered horse will show a higher agglutination of glanders bacilli. The agglutination test was first employed by Widal for the diagnosis of typhoid fever, and this reaction is at the present time known as the Widal reaction. The application of the agglutination test in veterinary practice has been used principally for the determination of glanders in suspected horses, and good results were also obtained from this reaction in the diagnosis of Malta fever in goats.

In the limited space of this paper it is impossible to describe in detail the technic of the agglutination test as used in veterinary practice, as the numerous publications on this subject contain detailed accounts of the technic and execution of this test. However, I cannot refrain from calling to your attention the modification of the agglutination test which is used at the present time for the diagnosis of glanders. This consists in the centrifugalization of the different dilutions by which the reaction is hastened in the test tubes, and the results can be read after the tubes have been placed in the incubator for two hours. A detailed description of the technic of this method of agglutination testing will appear in a publication on this subject by Dr. Mohler and myself, which is now in the hands of the printer.

PRECIPITINS.—The precipitation reaction was discovered by Kraus in 1897, when he observed that the filtrates of typhoid or cholera organisms showed a cloudy precipitation by the addition of the specific serum. Bordet and others further established that animals treated with serum or other proteids will develop in their serum substances which will also produce a precipitation in a corresponding proteid solution. The specific substances which are present in such serum are known as precipitines. The substances used as an antigen and which cause the formation of precipitines are known as precipitogenes, and the precipitation as the precipitate. The precipitation is in very close relation to the agglutination, and is considered by some as an identical biological reaction.

Frequently, distinction is made between bacterial and proteid precipitines, but as a matter of fact, these are only proteid precipitines, as the bacterial precipitines are also the proteid precipitines from the body of the bacteria.

The production of the precipitating serums is also undertaken in rabbits by injecting them with the desired proteid, and the test is similar

to the agglutination test, and is carried out by adding to the examining fluid a certain quantity of precipitating serum, when immediately, or after a short time, the cloudiness will be manifested. The time for the development of this reaction should, according to Uhlenhuth, not exceed twenty minutes.

The serum precipitation reaction is specific, that is, a reaction will result only from a precipitogene of the same origin. For instance, the serum of rabbits injected with human proteids will precipitate only human proteids. Of course, these proteids may be derived from any part of the human being; thus, from the blood, milk, liver, spleen, and from other organs.

While these precipitins are strictly specific, nevertheless, reaction may be manifested in the serum of closely related species, and of course this should be considered always in these tests. The serum of a rabbit treated with human blood will to some extent precipitate the proteids of monkeys. The serum of rabbits treated with horse blood will precipitate the proteids of the donkey, and in a similar manner the serum of rabbits treated with goose blood will precipitate the proteids of ducks. In order to eliminate these reactions in closely related species, Uhlenhuth recommended cross-injections. Thus, if one desired to obtain serum which will precipitate only human proteids, monkeys are treated with human proteids. In such cases the serum of the monkey will be specific only for the human proteids, and not for the monkey proteids.

In practice, the precipitation is employed in various tests. The most important of these tests is at the present time, without a doubt, the one for the establishment of the origin of blood. The test is extensively used in forensic medicine, and is the most reliable method which we have at our command to differentiate whether blood is of animal or human origin. Further application of this test is applied in the determination of different meats, and this constitutes at present the official test in Germany to determine the different kinds of meats contained in sausage or otherwise. It is further employed in the determination of infectious diseases; however, its application in this line has not given entire satisfaction, and it no doubt will require further experiments before this method can be employed with better satisfaction in the diagnosis of diseases. It has been more or less extensively employed in the diagnosis of glanders, and is considered by some investigators to give satisfactory results. For these tests various substances are used as antigens, some recommend mallein, others an extract of glanders bacilli, while Konew uses an antiformin solution of glanders bacilli. The test for glanders is made in such a manner that the two fluids, namely, the suspected serum and the antigen are brought in contact in such a way that there will be a distinct line at the point of contact of the two fluids. In the presence of glanders, a cloudiness will develop at this point of contact. In some cases of glanders the cloudy ring is very distinct and appears immediately, in other cases again, the ring is not quite as dis-

tinct, and is manifested only after twenty minutes to one-half hour. The principal disadvantage in this test lies in the difficulty of the reading of the reaction, due to the indistinct ring which is occasionally formed at the line of contact between the antigen and the serum. This test has also been applied to the diagnosis of typhoid fever, as well as for the diagnosis of anthrax and tuberculosis. The results, however, were not uniform, and its application has therefore not gained favor.

Lysins.—Lysins are immune bodies which have a dissolving action upon certain cells (cytolysis). Lysins also are produced in the body by the presence of antigens. These antigens may be bacteria or red blood corpuscles, or any other kind of cells, and accordingly we may distinguish bacteriolysins, hemolysins, and those destroying other forms of cells and which are in contradistinction known as cytolysins.

Prof. Pfeiffer has the credit of discovering the bacteriolysins. In his experiments with Asiatic cholera in 1894, he found that when cholera spirilla are injected into the peritoneal cavity of a cholera-immune guinea pig or when mixed with cholera serum, they are promptly killed, and almost completely dissolved. The same phenomena could be observed if the spirilla mixed with fresh immune serum were injected into the peritoneum of a normal guinea pig. The principle of the phenomena of hemolysis was first discovered and studied by Bordet and Gengou, and extended by Ehrlich, Morgenroth and Sachs.

To describe in detail the different forms of cytolysis would require more space than I could devote to this subject, and accordingly I desire to treat only briefly the most important reaction in this group which particularly concerns the veterinarian, the hemolysis. All other forms of cytolysis including of course bacteriolysis are practically identical in their phenomena with the reaction of hemolysis.

The object of taking up especially the hemolysis lies in the fact that this constitutes the fundament of the complement fixation test which at the present time is used in the sero-diagnosis of different diseases, of which I desire to mention particularly glanders and syphilis.

Hemolysis.—It is a well-known fact that if red blood corpuscles of one animal are introduced into another of a different species the blood of the latter acquires the power to dissolve the blood corpuscles of the former when mixed with them in a reagent glass. This reaction is termed hemolysis, which means the dissolution of blood corpuscles, thereby setting the hemoglobin free in the medium in which the corpuscles are suspended.

To illustrate this phenomenon, if a rabbit is injected intraperitoneally, intravenously, or subcutaneously with washed red blood corpuscles of a sheep, the blood of the rabbit will develop antibodies which possess a dissolving action for the sheep blood corpuscles; that is, the rabbit blood will contain specific hemolysins.

The acquired hemolytic property of the blood depends on two substances. One of these is present in the blood of every animal, and is

known as the complement. It is thermo-labile, which means that it is rendered inactive after the blood or serum has been heated to 56° C. for half an hour. The other body, which is formed as a result of the injection of blood corpuscles, is thermo-stabile; that is, it resists heating even higher than 56° C., and is known as immune body, fixative, sensitizer, or hemolytic amboceptor. The name amboceptor is derived from the fact that it has an affinity on the one hand for the blood corpuscles of the species of animal with which the animal has been injected, and on the other for the complement, this union taking place only after the first-mentioned affinity has been satisfied.

These two substances, together with the corpuscles to be dissolved, comprise the hemolytic system, and their combination leads to hemolysis. This means that an opaque suspension of blood corpuscles is rendered semitransparent or "laked." The hemolysis, strictly speaking, does not represent a complete solution, but only an action of the hemolysin on the stroma of the erythrocytes, which permits the escape of the hemoglobin of the red blood corpuscles.

The injection of blood corpuscles of one animal into another of a different species gives rise to the development of antibodies which confer upon the blood serum the hemolytic action. This phenomenon is somewhat similar to the production of receptors in the formation of antitoxins which are thrown off, but these receptors alone are not able to dissolve the red blood corpuscles, requiring also the presence of a ferment. This ferment, however, is a constant constituent of the blood and is known as the complement.

That both of these substances are constantly present in the hemolytic serum can be demonstrated in the following manner: If the hemolytic serum is heated to 56° C. for half an hour, thereby destroying the complement, this serum will no longer possess a hemolytic action; that is, it will no longer dissolve red blood corpuscles. This heating of the serum is known as inactivation. On the other hand, if to such inactivated serum there be added fresh untreated serum, which in itself has no hemolytic properties, hemolysis will result. Thus by the addition of this fresh serum a reactivation is accomplished. This is explained by the fact that through the heating of the serum one of the substances necessary for the hemolysis has been destroyed, which is the complement. After the complement has been destroyed by heating it can be replaced by the addition of any normal serum, because it is known that the complement is present in all blood. However, the guinea-pig serum appears to be the most satisfactory in the application of hemolysis, inasmuch as it is very rich in complement and only a very small quantity is required to be added to the inactivated hemolytic serum in order to produce hemolysis.

Specific Complement Fixation (Deviation).—Complement fixation is a biological reaction in which the phenomenon of hemolysis is employed as the fundamental principle. It is so called on account of the

fact that the complement has been fixed by the combination of antigen with antibody and thus prevented from participating in the hemolytic process in which it is essential in order to have hemolysis. By this method even small quantities of amboceptors (antibodies) can be demonstrated in a serum.

The presence of an infectious principle in the organism of an animal or a man has a stimulating effect on the production of antibodies (immune bodies). If a serum containing such immune bodies is inactivated and brought into contact with the antigen in the presence of complement, the complement will become firmly fixed by the combined immune body and antigen. Thus, anchoring takes place between the antigen and the antibody in which the complement becomes fixed. This anchoring is thoroughly established when the mixture is placed in an incubator for one hour. The addition of the hemolytic amboceptor and blood corpuscles to such an anchored antigen and immune body will have no effect. Thus, no hemolysis will take place, inasmuch as the complement has been fixed by the immune body and the antigen, thereby leaving the hemolytic system incomplete. On the other hand, if the inactivated serum contains no immune bodies, there would be no substance in the serum to anchor the antigen. As a result, therefore, no fixation of complement will occur, this being left free, and on addition of hemolytic amboceptor and blood corpuscles, hemolysis will now take place. Neither the antigen nor the antibody alone can fix the complement and thereby influence hemolysis when the hemolytic amboceptor and blood corpuscles are added. However, in combination the fixation will invariably take place, and on the addition of the hemolytic amboceptor and blood corpuscles hemolysis will not be produced.

Since the discovery of this phenomenon it has been utilized extensively in serum diagnosis, but probably its greatest value has been obtained from the Wassermann reaction for the diagnosis of syphilis. It has also been employed in other diseases with more or less satisfaction, and its great field in bacteriological investigations has not yet been exhausted for the practical diagnosis and determination of immune bodies in serum. In veterinary practice complement fixation is now gradually becoming used for the diagnosis of glanders. This method of diagnosing glanders has given most favorable results in Germany, and constitutes at the present time the official test for Prussia and other parts of Germany. It has also been used in the diagnosis of other diseases of animals, but not with such success as in glanders. Particularly in tuberculosis the results were not uniform and otherwise not very promising.

The presence of the specific immune bodies (bacteriolytic amboceptors) in the serum of glandered horses brings about the fixation of the complement when the antigen in the form of glanders bacilli extract is added to the hemolytic system. The serum of glandered horses, therefore, contains antibodies (immune bodies) against glanders bacilli,

which are specific only for the glanders bacilli and for no other infection. The complement fixation accordingly represents a specific test, as only in the presence of the glanderous immune bodies and glanderous antigen will the reaction take place. If, instead of the glanderous immune bodies, other antibodies of another infectious disease be present in the blood serum, they will exert no effect whatsoever on the glanderous antigen; and, on the other hand, if serum containing glanderous immune bodies is brought in contact with an antigen of another infectious disease, it will also have no effect on the reaction. By this fixation of the complement the hemolytic system is left incomplete, and as a result no hemolysis will take place. This fixation of the complement by the antigen and immune bodies of glanders in the horse serum constitutes the diagnostic test for this disease.

Opsonins.—The development of immunity is explained by the opsonic theory in a combination of the cellular theory (phagocytosis) and the humoral theory. The principle of it is, that the immunity is the result of the combined action of the body fluids and phagocytes. Phagocytes destroy the bacteria entering the body, but they are only capable of this when the bacteria have been prepared for them by the action of certain substances in the blood. These substances which are present in the serum of the blood were termed by Wright as opsonins.

Opsonins are present not only in immune serum, but also in normal serum, however, in the latter in much smaller quantities. The opsonin contained in normal serum is thermo-labile, inasmuch as it is destroyed when subjected to a temperature of 60° C. for fifteen minutes. On the other hand, the opsonin of immune serum which has been termed as "bacteriotropin" is more resistant and is not destroyed by 60° C. Accordingly, some investigators believe that there are two different kinds of opsonins. However, in Wright's explanation of the difference, the opsonins in the immune serum are present in greater quantities and in a more concentrated form, and accordingly they resist the heat better.

While Wright and Neufeld observed that the opsonins are different bodies from other immune substances this is however not accepted by others. It is very probable that they represent either the complements or the amboceptors, or a combined form of these two in the blood. It will remain for further experiments to establish what form of immune bodies the opsonins represent.

The opsonic theory has been utilized, although to a limited extent, for diagnostic, as well as for therapeutic purposes. Wright, who exploited, or rather first described this theory, employed it quite extensively in the treatment of infectious diseases, and since it has been employed in different countries with more or less success. In veterinary practice it has not been utilized to any great extent. Joest established an opsonic laboratory in connection with the treatment of infectious diseases, however, the results of his work have not yet been published. Its application in veterinary practice is used extensively by veterinarians

at the present time in the United States, although not in accordance with the scientific specifications which were laid down by Wright. I refer here to the present extensive use of the bacterins and autogenic bacterial vaccines which have gained great favor with the practising veterinarians of this country. The fundament of the use of these biological properties is the opsonic treatment.

In order to make clear the phenomena of the opsonic theory it is advisable to explain the various terms used in connection with this theory by Wright. "The phagocytal count," phagocytal value is designated as that number which is obtained from counting the average number of bacteria which are inclosed in twenty or thirty phagocytes. This number is known as the absolute index.

The "opsonic index" is designated by that relative number which specifies to what extent, whether lower or higher, the phagocytal count differs from the normal. That is, how the phagocytic action of the blood of a sick animal corresponds to the character of the blood of a normal animal. This is established by mixing the leucocytes from the affected animal with the bacteria and in an identical way with leucocytes from a healthy animal. These mixtures are then placed for a short time in the incubator, stain-smear preparations are made, and the results are observed under the microscope.

The absolute index of the blood of the examined patient is then established by dividing the results of the count with those obtained from the normal blood. The result of the division gives the opsonic index.

The value of the opsonic index of normal blood corresponds on an average to one. On the other hand, in infected blood it is usually more or less lower.

Accordingly, in the treatment by this method it should be aimed to increase the opsonic index, and according to Wright, this may be attained by periodical injection of killed cultures of the specific germs causing the disease. The injection is followed by lowering the opsonic index, and this is termed by Wright as the "negative phase," which usually lasts for two or three days. This is followed by the "positive phase" which represents the elevation of the opsonic index. New injections should be always undertaken during the positive phase, because if such should be made during the negative phase, the results would be unsatisfactory.

The bacterins and autogenic vaccines which are prepared by the various manufacturers of biological products are the vaccines which represent the substances used in opsonic therapy. Of course, in association with the application of these substances in veterinary medicine, no attempt is made to establish the opsonic index of the patient, and beside the injections are made at any time irrespective of whether it occurs during the negative or positive phase. [The injections are made at intervals of four to seven days, and therefore in nearly all cases during the positive phase.—ED.] In general, however, good results are reported from this mode of treatment of infectious and suppurative diseases.

ANAPHYLAXIS.—The entrance of foreign bodies into the animal organism always has a stimulating effect upon the production of antibodies. The appearance of the antibodies in the system is the indication of a struggle against the infection. The immunity develops after the successful struggle of the animal organism against infection, but these results are established only at a later period of the struggle. The reaction which takes place in the animal as the result of infection or from the effect of any antigen has been termed allergia.

Allergic changes do not mean an increased resistance of the body, but only that the sensitiveness of the body has changed towards the antigen (diminished or increased). When the animal is immune the sensitiveness is diminished or ceases entirely. During the process of active immunization, when the antigens are introduced into the body from time to time, on the days following the injections, that is, during the negative phases, such an increased sensitiveness may be observed. These then gradually disappear during the positive phases. Immunity is therefore preceded by a period of diminished resistance, or even by a hypersensitiveness towards the infection.

Richet, who carried out extensive investigations on this peculiar phenomenon of hypersensitiveness designated it as anaphylaxis. Anaphylaxis accordingly conveys that stage of immunity which is indicated by the hypersensitiveness or increased sensitiveness of the organism. Rabbits injected with serum of horses will show no reaction for several repeated injections. However, at the fourth or fifth injection they will often respond not only by a local reaction, but also by general systemic disturbances which very frequently terminate fatally in a very brief period. These reactions are strictly specific, that is, a rabbit will not develop these described symptoms when reinjected with any other but horse serum. Thus, if after the fourth injection, instead of the horse serum, the serum of any other animal is used or proteids of any kind, the animal will show no ill effects from the injection, which shows that through the first injections the animal developed a specific sensitiveness towards that particular proteid. The hypersensitiveness which is brought on by the administration of certain substances into the animal is not confined to the injection of serum as it was first thought, but to any forms of proteids; thus, if an animal is treated with egg-albumen, after a certain period, a hypersensitiveness of the animal for egg-albumen is established, and if the injections are repeated at such a period it will kill the animal by anaphylaxis.

The phenomenon of anaphylaxis is also manifested from the repeated administration of serums (antitoxins) as a result of which the so-called serum-disease will develop. This is simply an anaphylactic response of the body towards the repeated injections of the analogue proteids. Anaphylaxis in veterinary medicine is not of special interest. It comes first of all in consideration in the preparation of animals for the production of antitoxins, as well as for serums to be used in the complement

fixation test. In these animals, repeated injections may bring on hypersensitive conditions, and may result in sudden death from anaphylaxis.

Besides, it is also of some interest as the two probably most important tests in veterinary medicine, the tuberculin as well as the mallein reaction, is very probably due to such a hypersensitive condition of the body towards analogue substances, these two tests also representing anaphylactic reactions.

Army Veterinary Corps Needed

The United States has acquired colonies or "insular possessions" without having made adequate preparations for the administration of the same from a veterinary point of view. The ravages of rinderpest and surra in these possessions have been diastrous. The economical loss has not only been great, but the lack of method and knowledge in combating these great plagues has seriously hindered the pacification of the Philippines and retarded the progress of agriculture and allied interests. Ten years after those islands came under our control we were first beginning to establish a proper quarantine station, one of the first measures which should have been adopted. We have also trained some veterinarians in the hard school of experience to deal with tropical diseases of animals in an intelligent manner.

At present there is small inducement for veterinarians to enter insular work except for the experience it affords. The pay is not large, one in this work soon gets out of touch with the profession at home, the risks to health are considerably greater than in the United States, promotion is slow and there is little of it; there is no retirement on pension and more than all else local political influences are ever at work to nullify every effort.

As our insular possessions are administered by the war department it is evident that the veterinarians should belong to the army. What is needed is a well organized army veterinary corps.

The members of this corps should not only be well trained in their profession but should receive special training in the control of transmissible animal diseases and particularly the tropical diseases. In addition to English he should have a knowledge of at least one modern language and as our foreign relations will probably be largely with the Latin-American nations, Spanish is preferable.

If we had a veterinary corps of young men of high ideals, good character and such training, they would not only enter any country with the army but could take measures to protect both the horses of our army and the live stock of the occupied country against transmissible disease. Quarantines could be established as well as immunizing stations.

With such a corps in the War Department, a knowledge of transmissible diseases in all countries likely to come under our control could be secured and plans and methods for their control provided. The veterinarians would be under a definite central supervision and free from the annoyance and influence of politicians. They would enter a country with our army and could remain afterwards to give their services for the benefit of that country. They would have their foreign tour of services as well as at-home stations, be pensioned for disability in service and have retired pay should they live to the required age.

This plan I believe would give us a creditable veterinary service that would be efficient and economical and would demonstrate to the inhabitants of our insular possessions that our government was really interested in protecting their flocks and herds that are so important to material prosperity and to peace.

NELSON S. MAYO,
Chairman, Committee on Insular Possessions, A. V. M. A.

FOR SALE.—One Thermocautery, same as Fig. 1274, Haussmann & Dunn's catalogue, complete with puncture and feather points. Regular price $25.00; my price $14.00. Will send on inspection and pay express.

F. GILGEN,
Eaton, Colo.

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Biologics

Last month we gave in a single paper a concise review of the whole field of biologic therapy as applied in veterinary practice. This month, in the most excellent paper yet written on this phase of the subject, we present a resumé of what has been accomplished for veterinary science through the use of biologic products in the diagnosis of disease, identification of pathogenic bacteria, discovering the origin of various poisonous proteids, and in the identification of blood samples for forensic purposes.

We commend to every reader a careful study of this article, not for the purpose of accomplishing these results with biologic products but simply to know that such work may be done and how, and to be able to avail himself of laboratory assistance in these lines should opportunity offer, as it frequently does.

THE latest bid for notoriety comes simultaneously from City Boards of Health, in Iowa and Indiana, who are *trying* to discover the germ of infantile paralysis in hogs that have "broken down behind."

N. Y. S. V. C. Stands for Better Veterinary Education

EDITOR AMERICAN JOURNAL OF VETERINARY MEDICINE: In your editorial on the Toronto meeting of the American Veterinary Medical Association in the October issue of your journal you make the following statement in connection with the discussion on the length of the course of instruction in the veterinary colleges: "The representatives of the private schools fought hard to make this requirement read 'during a period of not less than *four years*,' and the bitter opposition of one of the state colleges to this was the greatest surprise of the meeting."

If you will consult the last two announcements of this college you will find that it already has an optional four-year course, which is taken by some of its students. I spoke, as did two of my colleagues, against the injustice of the argument advanced that students could be as well or better equipped for veterinary practice in twenty-four months spread over four years of six months each in schools which have practically no entrance requirements than can state schools equip them in thirty-six months spread over four years of nine months each, and which require the completion of a four-year high school course for entrance; in other words, we were told that the private school could and did do as much for the students in six months as the state schools did in nine.

We wish to state very clearly that we are *not* opposed to any advance in veterinary education by increasing the entrance requirements or lengthening the time of *actual* instruction. We always have stood and still stand for higher and better veterinary education.

V. A. MOORE,
Director New York State Veterinary College.

Ithaca, N. Y.

Regarding the Nominating Committee

EDITOR AMERICAN JOURNAL OF VETERINARY MEDICINE:

In your editorial department for the current month I find under the caption "Why a Nominating Committee" a quite serious arraignment of the acts and motives of the Nominating Committee of the A. V. M. A., in which the storm center seems to be the election of the president. The editorial says: "Dr. L. A. Merillat was the Association's second choice for president—but for the influence of the Nominating Committee he would have undoubtedly been elected. What would this have meant

for the Association? . . . . *As an author of veterinary textbooks his popularity is equalled by few if any American writers. Through his surgeries he is known to and has instructed more than ten thousand veterinarians.*"

At the Toronto meeting I was the oldest ex-president in attendance and consequently presided as chairman of the Nominating Committee. In calling the Committee to order the chairman suggested that in making nominations, especially those for president, the two chief factors to be considered were:

a. The professional record of the man, what he had done for the advancement of the profession.

b. Administrative ability.

Substantially I believe the Committee was agreed upon these points. Why was not Dr. Merillat nominated by the Nominating Committee? I can answer for but one member of the Committee—myself. My answer is based upon precisely the grounds you urge and consists of photographs from the pages of Dr. Merillat's books and from one other book.

1. I submit a photograph of an illustration in his surgery with its caption, "Fig. 243.—Lines of Incision for Ablation of the Mammæ of Cows." A casual examination of the illustration reveals a "cow" with *three* very odd teats, and *no* vulva. Does the genital tract of this breed of cows open into a cloaca like that of a hen?

2. I have placed on the following page, Figs. 34 and 142 from Merillat's surgery, together with Fig. 18 from the highly scientific work of Cornevin et Lesbre (see illustrations).

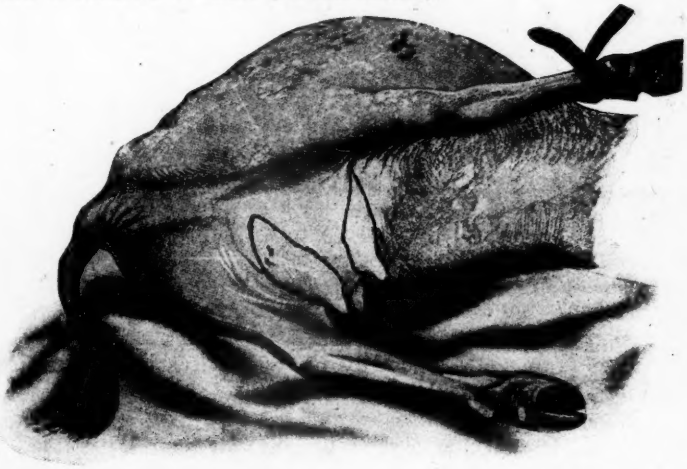

Fig. 243. Lines of Incision for Ablation of the Mammæ of Cows
"*Three Mammæ and no vulva*"

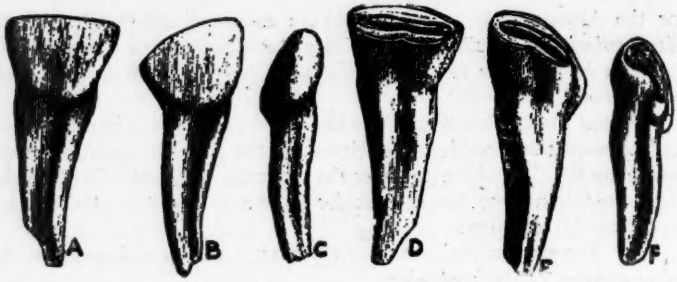

Fig. 34. Temporary incisor teeth of a horse. A, B, C, labial surface of central, lateral and corner. D, E, F, lingual surface of same. (Merillat.)

3. I have placed on the next page Fig. 100 from Cornevin et Lesbre, and below it on the left Fig. 153A and on the right Fig. 83 from the work of Merillat.

A glance at these reveals complete harmony and a remarkable identity between the six members of Merillat's Fig. 34 and the first six figures by Cornevin

Fig. 142. Wolf-teeth. (Merillat.)

et Lesbre (Fig. 18). There is also a striking likeness between the three lower figures of Cornevin et Lesbre and the three members of Merillat's Fig. 142 but a radical conflict

Fig. 18. (Translation.) Pincers, middle and corner superior incisors of the same colt shown in the preceding illustration, viewed from the same directions.

Fig. 17. (Translation.) Shows the incisors of a 1 year old colt. (1) viewed from in front; (2) viewed from behind; (3) viewed from the inner side.

Fig. 18. Pince, mitoyenne et coin superieurs du meme poulain que ci-dessus, vus sous les memes aspects

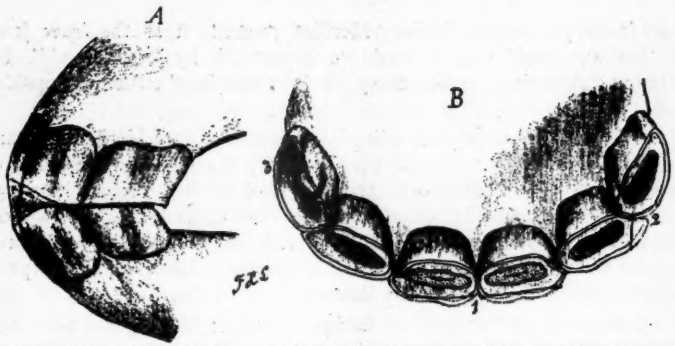

Fig. 100. Usures de tic. A, Biseau median anterieur, interessant les pinces et les mitoyennes des deux machoires.—B, Table usee de diverses manieres par le tic. 1, Biseau anterieur sur les pinces. 2, Encoche entre la mitoyenne et le coin. 3, Excavation de la table. (Cornevin.)

Fig. 100. (Translation.) Wear of Cribbing. A, Median anterior bevelling of pincers and middle incisors of the two jaws. B, Wearing tables showing the various changes from cribbing. 1, Anterior bevelling of the pincers. 2, Notch between the middle and corner incisors. 3, Infundibuli.

as to the caption. According to Cornevin et Lesbre they represent the inner or median view of the superior incisors of a colt: Merillat says they are wolf-teeth.

Fig. 153a. The mouth of a young cribber. (Merillat.)

An inspection of our third exhibit reveals a remarkable likeness between Fig. 100A of Cornevin et Lesbre and Fig. 153A of Merillat, but again the two writers disagree and Merillat makes it "The Mouth of a Young Cribber," while the B of Cornevin et Lesbre shows that they regard the horse as aged.

Comparing Fig. 100B of Cornevin et Lesbre with Fig. 83 of Merillat we note again a remarkable likeness in detail of the illustrations and an astonishing differ-

Fig. 83. An 8-Year-Old Mouth made "6" by "Blis-hoping." (Merillat.)

ence of view as to their meaning. Cornevin et Lesbre declare it the mouth of a cribber and submit it as an *upper* jaw to show the bevelling of the teeth from usury and (at 2) the notching of the teeth due to breaking

them in the process of cribbing: Merillat presents it as the *lower* jaw of "an 8-year-old mouth made 'a 6-year-old' by 'bishoping.'" Is cribbing "bishoping" upside down, or is "bishoping" cribbing, "upside up"?

I fully agree with your editorial estimate of Dr. Merillat "as an author of veterinary textbooks his popularity is equalled by few if any American writers." His books are doubtless the best "sellers" among veterinary textbooks in America and in the English-speaking world. His book on "Dentistry" is probably read by 5,000 American veterinarians to one who reads the work of Cornevin et Lesbre. They represent the antipodes of veterinary literature.

The work of Cornevin et Lesbre is one of the highest scientific ideals and represents years of sincere labor and study. Opposed to this form of literature we have another type which in order to distinguish it from *scientific* work is designated as "practical veterinary literature."

These two conflicting ideals are at war in practice, in the colleges of America, in our associations and everywhere. They met in the Association of Faculties at Toronto and there was a clash; they faced each other in the general meeting regarding entrance examinations and length of college curriculum and the sound of battle was heard; they met on the floor in the election of officers and the battle waxed strong.

As long as there is opposed to *veterinary science* a "practical veterinary science" illustrated by a dairy cow with an udder divided into thirds and having high efficiency without a vulva; and so long as illustrations score after score from "practical" veterinary books are indistinguishable from illustrations in our highest *scientific* works and they are yet said to illustrate wholly different facts, there will be conflict between these irreconcilable ideals.

I can speak for myself only when I say that the reason above submitted prevented me from favoring the nomination or election of Dr. Merillat to the presidency of the American Veterinary Medical Association at Toronto.

If the A. V. M. A. wishes to dispense with the Nominating Committee as at present constituted, I for one would appreciate the relief from the responsibility. I did not ask for a place upon the Nominating Committee, neither did I ask directly or indirectly for the presidency by virtue of which I was later made a member of the Committee. But so long as the A. V. M. A. places this obligation upon me I shall use every proper influence within my power to advance *veterinary science* as visibly affected by the nominees for offices in the A. V. M. A.; and to oppose the falsely designated "practical" elements as illustrated by a cow with an udder in thirds and without a vulva, or the other illustrations and captions shown on the preceding pages.

THE AMERICAN JOURNAL OF VETERINARY MEDICINE has placed one side of the question before its readers: will it also give room for the other side in its columns? W. L. WILLIAMS,

Chairman of Nominating Committee of the A. V. M. A., 1911.

Ithaca, N. Y.

[Our correspondent was in error in even questioning that we would publish his communication and thus give *both* sides of the question. We always just as far as our space will permit give everyone who has a reasonable message a hearing. This journal stands for fairness, progress and for the best interest of the veterinary profession. That is why the editorial criticising the Nominating Committee was published. It would have been much easier to have let the matter "slide" and kept still, but VETERINARY MEDICINE didn't win its position by keeping still for policy's sake, but by battling for the right as the editor saw it. An editor without opinions is a dead one, and one who is afraid to express his opinions is a coward.

Dr. Williams is in error where he says I arraigned the *motives* of the Nominating Committee. It was plainly stated that it is their action not their motives that is deemed unfortunate.

This communication was received near the day for going to press for the November issue and no opportunity could be given the "other side" for reply. Space for this reply is offered in the December issue with the stipulation that it be confined to questions raised in Dr. Williams' discussion and the preceding editorial.—D. M. Campbell.]

Veterinary Matters in the Philippines

On another page is given a report of the Committee on Insular Affairs of the A. V. M. A., in which the shortcomings in the administration of veterinary matters in the insular possessions of the United States are forcibly stated. Whatever may be said of the inadequacy of veterinary administrative matters in the Philippines in times past, at present, veterinary sanitary control work is far advanced, and efforts at prevention and control of diseases among animals and especially work looking toward the eradication of rinderpest from the islands is prosecuted with understanding and intelligence and all the vigor of which the circumstances admit.

The Bureau of Agriculture, under the direction of Dr. G. E. Nesom, has accomplished much for the improvement of live stock interests in the Philippines. A veterinary training school has been established where new appointees in the service may acquire a knowledge of tropical diseases and of the quarantine regulations of the Philippines.

Quite recently a veterinary college has been established and a five-year course outlined. This school should be able to produce veterinarians far better equipped for work in the Philippines, whether in the Government service or in general practice, than are the veterinarians it is now possible to secure in the United States and foreign countries.

Anent the Nominating Committee and Dr. Williams' Discussion

Elsewhere is published a reply to an editorial, in last issue, containing an arraignment of Nominating Committee of the American Veterinary Medical Association as an institution and a plea for its abolition. Concerning a veterinarian less prominent than Dr. Merillat it would scarcely be fair to publish this letter since he did not ask the Nominating Committee to present his name to the association or in any way directly or indirectly seek the presidency of the American Veterinary Medical Association. Neither did he before its publication have any knowledge of the discussion referred to, but Dr. Merillat is so widely and intimately known to the veterinary profession of this country that no discussion, nothing but his own acts or words, can influence his position in the regards of American veterinarians.

It must not be supposed as might be inferred from Dr. Williams' communication that Dr. Merillat's influence on the trend of thought in matters veterinary is limited to the effect of his books on their thousands of readers. Dr. Merillat has for more than a score of years been constantly engaged in teaching veterinary students, and a large number of veterinarians owe their inspiration to do and their basic knowledge of good surgery to this same teacher. Many of the excellent qualities of his teaching could be enumerated, but two will suffice.

Dr. Merillat by precept and example teaches his pupils that operative wounds made in the hospital or in the field where the veterinarian has reasonable control of conditions should heal by primary union. This is good surgery, and, while "practical", certainly detracts not from scientific veterinary medicine. Again Dr. Merillat has probably done more than any other veterinarian to popularize the use of anesthetics in veterinary practice, and almost nothing else distinguishes the scientific veterinarian so sharply from the "practical horse doctor" as does the regular and frequent use of anesthetics.

Merillat's surgeries, particularly his dentistry and volume III, admittedly are not highly scientific works judged from Dr. Williams' standard, but they are a description of the kind of surgery that he does in his own hospital, which must be conceded by all to be very much superior to the average of veterinary surgery as it exists in America, and to the extent that his surgeries and his teaching have tended to bring the average veterinary surgery up to his own standards, has Dr. Merillat served well his professional brothers and deserved at their hands any honor they can confer upon him, and to the same extent did the Nominating Committee of the American Veterinary Medical Association err in encompassing his defeat for the presidency of that association.

Recent Publications

Veterinary Bacteriology. By Robert E. Buchanan, Ph. D., Professor of Bacteriology in the Iowa State College of Agriculture and Mechanic Arts, Division of Veterinary Medicine. Octavo of 516 pages, with 214 illustrations. Philadelphia and London: W. B. Saunders Company, 1911. Cloth, $3.00.

This work is a treatise on bacteria, yeasts, molds and protozoa, pathogenic for domestic animals, intended for the use of veterinary students and veterinary practitioners. It is plainly, though not in all places carefully, written, well illustrated and adequately covers the important field for which it is intended.

After giving a short but comprehensive review of the history of bacteriology, it discusses briefly some of the more common nonpathogenic germs as well as fungi and yeast. After giving the reader an insight into the part microorganisms play in certain processes, as brewing, bread making, the manufacture of vinegar, effect of bacteria upon dairy products, soils bacteria, effect of microorganisms upon foodstuffs and other fermentive processes as well as putrefaction, the author takes up in a systemic manner the subject of antibodies and immunity. The discussions of all these subjects is brought right down to the date of publication.

The method of conducting animal inoculations as well as the preparation of the various serums and vaccines is excellently handled. Insufficient consideration is allotted to bacterins.

Chapters are also devoted to pathogenic protozoa, yeast, and fungi. The discussions of the contagious diseases in which the specific organism or cause is not certainly known (the ultramicroscopic group) is less satisfactory, though with the exception of dog distemper and infectious anemia in horses the latest knowledge on the subjects is given.

The extensive and rapidly increasing use of biologic products in veterinary medicine, in both the diagnosis and treatment of disease, causes the subject of veterinary bacteriology to take on a new and enlarging importance with each succeeding season. Dr. Buchanan's work is timely in every sense of the word. The trend of veterinary therapy to the subjects discussed will bring it an eager acceptance from all who pride themselves upon being in the forefront of progress in matters veterinary, and it will disappoint no one.

Dourine of Horses: Its Cause and Suppression. By John R. Mohler. Bureau of Animal Industry Bulletin, 142. This is a most opportune publication and one we urge every reader to secure at once. The Bulletin reviews briefly the history of the several outbreaks of dourine in this country since its discovery in Illinois in 1886 by Dr. W. L. Williams but deals chiefly with the recent appearance of this malady in Taylor County, Iowa. A number of illustrations are given, showing

typical cases in the early and in the advanced stages. The symptoms, differential diagnosis and means of eradication of dourine is dwelt upon at length.

Anthrax, with Special Reference to the Production of Immunity. Bureau of Animal Industry, Bulletin 137, by Charles F. Dawson, M. D., D. V. S. This is a very valuable publication and goes at some length into the history, course, symptom and location, methods of diagnosis and treatment of this disease, but is particularly intended to record Dr. Dawson's experiments in the production of immunity to anthrax. A variety of agents suggested for the production of immunity to anthrax were tested, but nothing was found better or in fact equal to the anthrax vaccine, prepared after the method of Pasteur, except that the author was able to prepare a single anthrax vaccine that worked equally as well as the double vaccine ordinarily used. The author was able to produce an antibacterial serum for anthrax in the blood of sheep. The sheep was first rendered immune with vaccine and then given increasing doses of virulent anthrax cultures until its resistance had been raised to more than fifty thousand times that of a normal sheep. Serum from this sheep conferred temporary immunity which will be of immense importance in controlling outbreaks of anthrax. Because of the considerable period required to produce immunity by the vaccination method, sanitary officers have been handicapped to a considerable extent in the control outbreaks of this disease, but with this anthrax antiserum, a temporary immunity can be conferred immediately in herds of animals in which the disease has already appeared and the anthrax vaccine used only on those animals who have not been exposed to the infection.

The Milk Supply of Chicago and Washington.—Bureau of Animal Industry Circular 138, a description of the production, method of shipping, care and distribution of the milk of these cities, with illustrations of the best and the worst milk depots, bottling, pasteurizing and distributing plants, and a record of the work of the milk inspection departments, also an account of the activities of various producers' organizations. An important publication for milk inspectors—and in fact for all milk users.

Experiments in the Production of Sanitary Milk.—West Virginia, Experiment Station, Morgantown, W. Va. Bulletin 134. This is a record of a large number of experiments designed to discover the sources of contamination of milk from before it is drawn from the udder until it reaches the table of the consumer. Many tabulations of the results are given. The bulletin contains illustrations of old and of new bottling and cooling apparatus and of the milk room of the famous Walker-Gordon dairy farm at Plainsboro, New Jersey. It is intended

for those who have charge of the production and distribution of milk and who have a sincere desire to see it reach the consumer in the best possible condition.

Preliminary Observations on Bob Veal.—The department of Physiology of the New York State Veterinary College, under the direction of Dr. Pierre A. Fish, from time to time conducts original investigations, often of veterinary physiologic subjects that have elsewhere received little or inadequate study. Some time ago quite a lengthy review was given in these pages of this department's investigation of the therapeutics of barium chloride. A discussion of other reports of Dr. Fish and his classes in physiology will be given in the near future. The record of the observations on bob veal given in the latest report of this department is of very great importance to meat inspectors and others likely to be called upon to determine the age of a slaughtered calf. An abstract of it will be published later in case any are unable to obtain the original bulletin and request its publication.

The investigations while not complete indicate among other things that bob veal is as wholesome and as palatable as market veal or beef, though it is slightly less nutritious.

Papers and Proceedings of the New York State VeterinaryMedical Society is the title of a report recently issued by the Society whose name it carries. The report includes the secretary's minutes of the August, 1910, meeting, the president's address, a copy of all papers read at the meeting and a fairly full reproduction of the discussions of the papers.

The report, which includes 131 pages of printed matter, is more than creditable. It will increase the interest in the Society, enhance its standing with the profession, add to the membership and help to secure more and better papers for each meeting, and in every way further the interests of the society and its members.

Drs. W. G. Hollingworth and P. A. Fisk were the prime movers in the publication of this report, and to them much credit is due.

NOTICE: The Illinois State Veterinary Association Meets December Sixth and Seventh, at the Lexington Hotel.

J. H. CRAWFORD,
President.

Pointed Opinions on Live Topics

BY READERS OF

Veterinary Medicine

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the thanks of the editor, the approval of the veterinary profession and the lasting gratitude of those who are aided by your suggestions.

Be Thorough With Nail Wounds

I recently treated a roan gelding weighing about 1600, that had stepped on a nail about three weeks prior to the time I was first called. The owner removed the nail and poured turpentine into the wound, but the lameness continually increased and the animal had not lain down since day of injury.

When I saw the horse he was standing on three legs, in very bad condition, with pus discharging posteriorly at the coronary band. The puncture was near the middle, from front to back of the left cleft of the frog.

I opened up the nail wound and put on a flaxseed poultice made with hot creolin solution and gave one ampule of poly-bacterins (Abbott). I continued treating for four days with antiseptics and poultice, but could see no improvement, in fact if there was any change the horse was steadily growing worse.

I told the owner the only chance lay in a radical operation to which he consented. The horse was cast and chloroformed and resection of the perforans tendon performed as described by Dr. Williams' "Surgical and Obstetric Operations."

After scraping away the diseased portions of the badly infected wound, I packed the cavity with iodoform and tannic acid and bound the foot up with a tar bandage, using antiseptic treatment until the wound had filled in.

The horse laid down for the first time since the accident that night; I gave one ampule of poly-bacterins, every four days after the operation and the case made an uneventful and fairly prompt recovery.

Although I am a country practitioner and have to operate under a great many difficulties I have had very fair success, which I attribute to using as strict antisepsis as is possible and general anesthesia wherever practical.

J. Atkinson Wilkinson.

North East, Pa.

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[The undesirability of temporizing with nail (and other) wounds, is forcibly illustrated by this and many other cases that might be cited. The use of bacterins has been attended by many happy results in veterinary medicine and at least by

this disadvantage i. e., things have been left for bacterins to do which should have been accomplished by radical (or conservative) operation.

The extremely wide use of bacterins has had many advantages, and if it has had any disadvantages it is just this: The failure on the part of the doctor to use such measures other than the use of bacterins as the conditions warrant; the failure to resort to surgery to accomplish that which could not be accomplished otherwise. It is so much easier and pleasanter for most of us to use the hypodermic syringe than it is to resort to the knife, the operating table, and anesthetics, that we are prone in doubtful cases and some that are not so doubtful to *try* bacterins alone first and supplemented by such other treatment later as we may be compelled to give and as we should in many cases have used in the beginning to the very considerable saving in time for client and suffering for our patient.—ED.]

A Cement "Splint"

I was called to see a very lame horse. On reaching the place I found a four-year-old blind gelding with a broken fetlock. I told the owner I could make him go as sound as ever but the cost would be more than the horse was worth —he said go ahead.

The owner after much difficulty finally got the horse into stable and I proceeded to "set" the leg. I first had the attendant clip the hair about the injured part. I then painted the fetlock with iodine—had my bandages all rolled and ready; then my assistant mixed plaster of paris ten parts and Portland cement one part together. I applied a thin layer of cotton batting around the fetlock and then rolled on the bandage with a thick coating of the plaster of paris and cement on it until I got the right thickness.

This horse was not put into the swing at all. He was quite troublesome. He was bound to paw, but in six weeks he walked out of hospital and home, a distance of three miles, as sound as ever.

A. M. VAN CLEAF, V. S.

Bloomfield, Ont., Can.

Azoturia and Autotoxemia

I believe azoturia is an intoxication due to chemical decomposition of ingesta, which results in the formation of poisons that are absorbed by the blood. A small amount of exercise, which throws additional nitrogen into the blood stream to be eliminated, precipitates the attack. In severe cases after two or four days the urine becomes red. This is a certain indication of parenchymatous inflammation of the kidneys. This is frequently the cause of death in cases of azoturia.

A. H. BAKER.

Chicago, Ill.

Should Be Able to Save Money

Talk about the high price of living! Here comes Dr. Geo. Ward, who is a "veterinary," and lives in Connecticut. He is seventy-four years of age, and challenges anyone in his state to walk

any distance, and at any speed—anyone, anywhere in the world. Dr. Ward says that a man who wishes to live cheaply can grow into a "pillar of strength" on ten cents' worth of oatmeal a week, but the Doctor likes luxury too well to confine himself to oatmeal, and he is not so stingy that he minds spending 26 cents a week pampering himself. "All of us have our weaknesses," he explains, "and mine is for peanut butter and crackers, so I don't begrudge the expense."

Having a grocery bill of $13.52 a year, Dr. Ward can hardly be expected to sympathize with those of us who like sugar at 8 cents a pound and porterhouse steaks at 25 cents—and lots of them.

—*Clinical Medicine.*

Tuberculosis in a Hen

Dr. B. F. Kaupp, of the Division of Veterinary Science of the Colorado Agricultural College, has just had sent to his laboratory a case of tuberculosis in a hen. The liver, spleen, lungs, pleura and peritoneum were affected. The bird had access to sputum from a tuberculous person.

X-Ray in Veterinary Practice

The Division of Veterinary Science of the Colorado agricultural College has introduced into their clinic an x-ray machine. This is proving useful in examination of fractures of the bone in horses, dogs, etc., as well as in locating foreign bodies. The students are much interested in this new work.

A Desirable Dry Dressing

I use a bismuth subiodide dressing for wounds in dogs, both operative and accidental. This substance, although a powder, acts very much like collodion and will hold cotton dressings very snugly.

C. A. WHITE.

Chicago, Ill.

Strange Foster Mothers

An instance of a cat acting the part of foster-mother to a young rat which was related recently in *Nature Notes*, reminds me that although I have never personally witnessed this apparently unnatural affection between cats and rats I have seen cases which were quite as wonderful. Two or three seasons ago a hunting friend showed me a fox being reared by a foxhound bitch, and not only did the canine foster-mother successfully bring up her charge, but the cub played, ate, and slept with the young hounds until these were separated to be put out to "walk." At another time a gamekeeper, while in my company, placed a baby rat in a ferret hutch which was occupied by a mother and two young ones. The young rodent at once ran for safety to the ferret's nest, and the mother immediately began licking it. The last I heard of this rat was that it and the three ferrets were living in perfect harmony. A cat's maternal instinct seems to be particularly keenly developed, and a common tabby of mine has on several occasions acted as a foster to motherless puppies. And when I was breeding prize rabbits I annually brought up some on a Manx cat that I then owned. Puss could hardly have been ignorant of what the youngsters really were, as she was an inveterate poacher, and I have seen her bring home young wild rabbits and lay them beside her foster children, just as she would have done if these had been kittens. I thought at first that the difference in color between the wild and the tame rabbits might have misled her, but she acted in the same way when she was rearing young lop-ears whose color was practically a wild grey. During the

past summer, a cavy sow which I had given to a boy, fondly mothered two young hedgehogs whose parents had been killed in a hay field. If I remember rightly, it was last year that an Irish terrier bitch belonging to a gentleman in a badger hunting county nursed a litter of young badgers. This bitch's puppies had previously been removed, and probably that may have made her more anxious to adopt the badgers, although I have to admit that in the majority of those misplaced maternal affections, or whatever term one may apply to them, the mothers have simply accepted the little aliens as additions to their own families and not as comforts in bereavement.—W. H. in the *Scotsman*.

A Hemaphrodite Pig

The illustration shows a two-months-old hemaphrodite pig. This

pig is eight months old now and normal, except sexually. It apparently is chiefly female, but as is shown in the illustration has well-developed testicles.

G. U. MARCHAND.

Urichville, O.

Copper Sulphate in Lymphangitis

About two years ago I was called to treat a very bad case of mycotic lymphangitis. I used every indicated remedy which I knew anything about, and tried a great many things that were not indicated in this case, but it grew progressively worse.

The leg attained an enormous size, and finally got to discharging more than two gallons of pus daily. The animal was then destroyed.

Very soon after, a horse standing in the adjoining stall was similarly affected and seemed to have an even more malignant type of the disease than had the first horse. This animal I gave only arsenic trioxid and copper sulphate. A complete cure was affected in about six weeks. About two drams of the copper sulphate and two grains of the arsenic trioxid were given at a dose. This was given at first four times daily, then three times, and during convalescence once or twice daily. The animal was thrown off its appetite by this treatment and was given stomachics a part of the time.

E. L. QUITMAN.

Chicago, Ill.

That "Warty Case" Again

In the April issue Dr. W. A. Moeller asked for a prescription for warts on a heifer, stating that she was literally covered with them. Having a prescription I thought from experience would be of value to him, and living near, I wrote him personally giving my prescription in order that he need not wait for the succeeding issue.

The prescription called for the application of a saturated aqueous solution of potassium bichromate.

Inclosed is his letter which you may publish, as this condition is prevalent in cattle.

F. L. ROACH.

Preston, Ia.

Dr. Roach, Preston, Iowa.

DEAR DOCTOR.—Yours of April 16th, 1911, at hand. In reply will say I

used the super-saturated solution of potassium bichromate on the "warty case," as you advised, and it worked wonders, the last warts disappeared about a month ago.

Before treatment was applied some of the warts had grown as large as your two fists. By applying it three times daily the heifer seemed to absorb enough to get a poisonous effect. She must have licked the warts, as she became very gaunt and would not eat. After three or four days' treatment we would turn her out to pasture for a week and then repeat the treatment.

Thanking you ever so much for your advice.

W. A. MOELLER.

Pocahontas, Ia.

A Peculiar Case

Recently I was called to treat a 14-year-old bay gelding weighing about 1,300 pounds. The owner said this horse had never before been sick. I found his pulse sixty per minute and temperature 102° F. There was not much flatulence and very little peristalsis. But the patient was in great pain.

I gave a pint of oil into which I put one ounce of turpentine and two drams of cannabis and prescribed the following:

℞

Spts. ammon. arom...ozs. iii
Sulph. æther.....oz. i
Flex. zingiberis.....oz. i
Flex. cannabis ind.....oz. i
Aquae, q. s.....ozs. xii

Sig.: One ounce in an ounce of water every half hour until five doses have been given. At this time the patient became easier and began to eat hay. I left him fairly comfortable.

Two days later the performance was repeated except that this time I gave instead of the oil a cathartic ball. Again in four or five hours the patient eased up and nibbled hay.

The evening of the next day I was again called to see this patient and found him perspiring profusely, getting up and down frequently. When down he would roll onto his back or sit on his haunches like a dog, frequently drawing his nose along the abdomen. His pulse was eighty and weak; the temperature 103° F., much flatulence and no peristalsis to be heard. I gave another cathartic ball, as the previous one had produced no defecation and also an ounce of chloral in a capsule.

In a short time patient appeared easier and cooled off. I then gave one or two high enemas of saline solution, which was not retained long, one grain of arecoline and one-half grain of strychnine. In ten minutes the pain was so great that it was almost impossible to control him; loud peristalsis was set up and gas escaped but there were no evacuations.

The owner's wife after seeing all this insisted on having another veterinarian, and I telephoned for the best on this section, who lives ten miles away. On his arrival some two hours later the horse was freer from pain, but the doctor gave an unfavorable or at best a very doubtful prognosis.

My consultant, after tapping the horse and getting a small amount of gas, administered one grain of eserine intravenously. In ten minutes the patient had a small watery evacuation and continued to have them till early in the morning. Next day the patient

stood still in his stall but refused to eat or drink. On the following day he began to eat a little hay and grain though very little was allowed him.

Two weeks later I was again called and found the horse in the same condition as before. Pulse quick and weak; flatulence more on the left side this time; no peristalsis whatever. I tapped the cecum, gave a cathartic ball and followed with a few doses of colic mixture. In three hours there was no improvement and I gave a grain of arecoline and a half-grain of strychnine, which produced some peristaltic action and the escape of some gas. He was easier in a couple of hours and I left, telling the owner to watch him for he might have another attack any time. The owner told me later that he was quiet six or seven hours this time when he called me again. I was away on a call at the time but two hours later found my patient running around the orchard as if crazy. Sweating profusely, eyes glassy and every muscle in his body trembling. I advised his owner to destroy him at once, and he did so.

At the autopsy the bowels showed extensive inflammation but the most peculiar thing to be seen was a cord wound around the large intestines. On removing the cecum we found attached to it about one foot from the free end a cord about one-half of the size of a man's wrist and eight inches long. It was looped around two divisions of the large intestines and attached to the peritoneum on the floor of abdomen about five or six inches anterior to the umbilicus, and seemed to cause strangulation of the bowel.

Was this cord congenital or had it formed during life? Its cause?

F. D. COLES, V. S.

Jewett City, Conn.

Likes "Drug News"

I wish to express my gratitude for your kind favor in sending the labels and Lee's Recipes, and last, but by no means least, your valuable journal *Physicians' Drug News*, which I find to be very valuable to me, and I know it would be so to other veterinarians if they would only send for it. They don't know what they are missing by not having a book like it in their office, as its usefulness is not known until they have one and read it.

E. W. VAN VRANKEN.

Toronto, Can.

Colorado's Veterinary Practice Act

No doubt a copy of our recently amended veterinary law will be of interest to your subscribers and especially so to those in states not yet protected by such laws. It may at least serve as a guide for those who contemplate presenting a bill to their legislators at their next session who, as in our own case, may be good compositors but extremely poor lawyers.

For the past ten years there have been frequent spasmodic attempts to get a good veterinary bill before the Colorado legislature, but every time one was presented, that did not place the non-graduate

upon the same plane as the graduate, politics began to play a part, with the result that the bill was withdrawn to await a more favorable time, which of course never came, since the non-graduate practitioner always was on hand with his little joker which never failed to tie to the bill at the eleventh hour. It was only after the non-graduates organized what is now known as the Pioneer Veterinary Association of Colorado, that the members of the regular graduate organization would treat with them.

However in the years of 1908 and 1909 both organizations came to terms and agreed to allow a bill to be presented that would give the non-graduate a license, upon passing a reasonable and practical examination, with a percentage of seventy. Such license did not permit of the use of the words veterinarian or veterinary surgeon or even veterinary practitioner. Nothing other than the words "non-graduate veterinary practitioner," would be permitted at any cost.

The veterinary bill known as the "Act of 1903" had not the power to stop quackery, but had the power to legalize all licenses granted by the veterinary board to all veterinarians holding a diploma of any kind or character, including those of three-year schools, two-year schools, diploma mills, and others.

By the act of 1909 a non-graduate did not have to be in actual practice more than three years in the United States and could take the non-graduate examination as often as he pleased if he had the $5 fee required, in fact our State Board of Examiners were lawfully bound to give an examination twice a year, this to go on indefinitely.

All this has now been changed by this year's amendment, which requires five years actual practice in this state, and this state only, and but one, and only one, more examination is lawfully required. This law as it is amended is a good one, but owing to haste and a lack of legal training the new veterinary law is inoperative not only against quackery but against the assumption by non-graduates of college degrees, and the displaying of misleading signs and stationery. It is also deficient in not providing for the revocation of the license for malpractice, gross immorality, etc. This leaves those who have received licenses under the Act of 1909 free to do practically as they please without any fear of having their licenses revoked.

This explanation is sent along with the printed copy of the law merely as an endeavor to make it more clear to you why it should be taken up for discussion and sent broadcast as a warning to the members of the veterinary profession in other states.

When constructing a bill of this kind veterinarians should let an able lawyer have at least one last look at it before turning it over to a legislator for presentation to the law makers of their respective states.

ROBERT F. DUFFY.

Denver, Colo.

A Common Nail-Prick; Its Treatment

Brown gelding, 8 years old, 15.3 hands high, weight 1,000 pounds. Diagnosis: nail puncture, open navicular, etc. Treatment: Polybacterins, nuclein, gelseminine, ichthyat.

This animal had been treated for "bruised heel" for thirteen days and a nail was found penetrating the point of the frog and directed backward and upward toward the navicular, it being a six-penny wire and imbedded its entire length. Following its removal a copious discharge of serum and synovia appeared which macroscopically was free from pus.

Gelsemium was given in two- to four-dram doses to relieve the terrible nervous condition. Bacterins in the increasing doses upon dates given. Nuclein from the 20th to the 27th (may not have been needed). The wound received a free opening for drainage with no dressing but frequent renewals of absorbent cotton until discharge stopped. The cotton was held in place by a specially constructed shoe with plate covering entire bottom of the foot. The following is a record of his condition on the days the injections of bacterins were given:

Aug. 14: Appearance of distress, temperature 103° F., respiration 30, pulse 78, bowels hard, appetite nil.

Aug. 17: Appearance better, temperature 100.4° F., respiration 20, pulse 58, bowels hard, appetite slight.

Aug. 20: Appearance better, temperature 100° F., respiration 16, pulse 56, bowels softening, appetite fair.

Aug. 23: Appearance better, temperature 100° F., respiration 16, pulse 62, bowels fair, appetite good.

Aug. 27: Appearance good, respiration 14, pulse 50, bowels good, appetite fine.

Aug. 31: Appearance good, respiration 14, pulse 44, bowels normal, appetite fine.

The coronary band which was badly swollen completely around was dressed with ichthyat and renewed as often as it dried. This was put on just enough cotton to hold in place until a sheet of oil cloth could be applied and a bandage over all.

On the 17th the swelling of the coronary began to decrease; discharge from wound greatly decreased, and animal would rest the weight of the limb on the ground very carefully. At this visit it was decided to apply the shoe to facilitate dressing, believing that a little weight might be borne if the frog had no pressure. The shoe was very helpful in this way.

On the 23rd all symptoms decreased and some weight was borne upon the injured member with practically no discharge.

On the 26th the animal was much brighter; the foot was hardening and drying at the heels which had previously looked very much as if they would open. The frog wound was reopened slightly to observe if any discharge would appear; none. Considerable weight was placed on the foot.

On the 31st, improvement was so marked that immediate recovery was apparent. I began to stimulate the coronary band.

Up to the 27th the animal refused to lie down and some attention, as massage and bandaging, were given to the sound limb.

Alfalfa hay, scalded bran mashes, including small quantities of crushed corn and oats, constituted the diet.

The sides of stall and manger were padded and covered with oil cloth, and very little abrasion and scalding resulted, although the weather was very hot.

E. M. BRONSON.

Indianapolis, Ind.

Chloralose as a General Anesthetic in Ruminants

The author's experiments in sheep, rabbits and cats lead him to recommend chloralose, which is chloral-glycose, as a general anesthetic which is not dangerous, especially in intravenous application. It is especially applicable in ruminants, for which, so far, a reliable anesthetic had not been found.—KICHISCHKOWSKY, *Therap. Monatsh.*, 1911, Aug., p. 496.

Cooling Uterine Douches

In the July number of the JOURNAL I notice an article by Dr. Van Sickle as to the treatment of a case after the manual removal of the placenta.

Through the kindness of one of the veterinarians of this state I am now using with extra good results the following treatment.

Start in flushing the uterus with a solution about the temperature of the body, gradually lowering it until it is cold. Stimulants are given per orem.

This will not do in all cases, for only a few weeks ago I lost a cow from which I had removed the placenta myself.

H. H. HILL.

Brookings, S. D.

Utah Veterinary Meeting

The Utah Veterinary Medical Association met in annual session at Salt Lake City, October 5, 1911, with President J. H. Halton in the chair. The following business was transacted: A decision arrived at as to the price of calls and surgical operations; the election to membership of Arthur Vance, A. J. Webb, H. J. Frederick, Archie Egbert, and H. M. Williams; election of officers for ensuing year as follows, Dr. H. J. Frederick, president; Dr. Emms, vice-president; Dr. A. J. Webb, secretary and treasurer. The question of quackery in the state was discussed and the association decided to work with the examining board for its suppression

It was voted to hold a special meeting at Logan, sometime in March.

A. J. WEBB, D. V. M.
Secretary.

Layton, Utah.

Treatment for Septicemia

In the July VETERINARY MEDICINE, page 674, is recorded a case for discussion.

This in my opinion was a case of septicemia (puerperal fever). Death being brought about by infection and autotoxemia, terminating perhaps in peritonitis and death.

Etiology: Perhaps a difficult parturition, unscientific removal of placenta, asepsis being ignored.

This form of disease calls for prompt and specific treatment, as delays are dangerous.

I will outline my treatment: For the fever give aconitine, veratrine and strychnine. I associate these three for two reasons, first the strychnine counteracts the depressing effects of the other two and second, I give the veratrine because it is a good remedy in case the disease is associated with eclampsia, and the whole helps to equalize the circulation, which is a prime factor.

For the infected uterus, make sure that all particles of placenta are removed. Inject a twenty-five-percent solution of peroxide hydrogen, then irrigate womb thoroughly with a good quantity of distilled water and siphon it out. Then inject a quart of chinisol solution 1 to 1000 and allow it to remain. This last injection should be made t. i. d. Sometimes I also insert into the vagina a dry gauze thoroughly dusted with chinisol one part to twenty parts boric acid.

In such cases I invariably use nuclein once daily and would advise antistreptococcic serum. Give a dram of fluid extract of echinacea every four hours for forty-eight hours or give calcium sulphide till system is saturated.

Keep bowels regulated with small doses of sodium sulphate, also give a stimulating diuretic (Spts. eth. nit.).

Summary:

1. Maintain asepsis of the vagina and uterus.
2. Equalize circulation.
3. Attend to the opsonic index by use of nuclein and the serum.
4. Eliminate through bowels and kidneys, and
5. Attend to the general comfort of the patient.

E. E. HOBBS.

Holton, Kan.

Instructors Change Locations

Dr. R. R. Dykstra, Professor of Surgery in the Veterinary Department of the Iowa State College, has resigned his position and accepted the chair of surgery in the Kansas State Agricultural College. Dr. K. W. Stouder, until recently Professor of Surgery in the Kansas State Agricultural College, has accepted the position of Veterinarian to the Kansas Livestock Commission, with headquarters at Topeka.

A Case of Tetanus

As many a case report which has appeared in VETERINARY MEDICINE has helped me out in my practice, I feel it my duty to report a case of tetanus which I have been treating.

A stock owner came to my office one Saturday stating to me that his imported standard bred stallion was ailing from what he thought to be kidney trouble. Upon getting the symptoms from him as

fully as possible I was very much afraid that his horse was suffering from tetanus. Upon my visit the next morning I found a well-developed case of tetanus.

Upon examination I could not find any bruise or other injury of any description and the owner stated that the animal had not been lame at any time to his knowledge. I at once gave one ounce of aloes followed by the injection of 30 Cc. of antitetanic serum.

I repeated this dose of serum every three hours for four days, then dropped to every four hours until the sixth day, when I stopped treatment with the serum.

On the fourteenth day the animal seemed entirely recovered. My opinion is that the most of our fellow practitioners do not give large enough doses of antitetanic serum.

A. C. BURT.

Simcoe, Ont.

Pneumonia in Cattle

Cause.—The bovine is more susceptible than the horse to fibrous degeneration of the lungs, mainly because there is less tendency to suppuration and also because the excess of connective tissue in the organ makes a very favorable basis for the formation of fibrous tissue. It may succeed almost every form of pulmonary inflammation; fibrinous pneumonia, broncho-pneumonia, inhalation pneumonia, lung plague, etc.

It was not noticeable in this locality until a week or so after the cattle had been put into the stalk fields. Then it became very common. In a bunch of twenty or thirty head sometimes there would be five or six to develop this disease. On examining the stalk fields one would find many faulty, small, wormy, and very dusty ears of corn.

Symptoms.—A persistent, dry cough, rarely moist, intensified by driving or by pinching the back, hurried and labored breathing, wheezing or sibilant rales in the chest, a reduction of the percussion resonance over given areas, with increased or even drumlike resonance around it, dry, withered hair sometimes erect on back, hide bound, dry muzzle, drooping ears, slight tympanites, constipation in the first stage of the disease and in the light forms.

Autopsy.—Shows only the lungs and mucous lining of the trachea affected. When the animal dies soon after it becomes affected, only a hemorrhagic condition is found throughout all the lung tissue, and if the disease has been in progress for fifteen days, there will be found pus cavities here and there throughout the lobules. The pus from these places is somewhat thinner and lighter in color than the common abscess pus.

Course.—The duration of this disease varies from three to thirty days, the first five or six days is the period of greatest danger. After nine days there is but little danger.

Treatment.—First place the animal in a well ventilated, warm stall and cover with a blanket. To one quart of warm water add two pounds of magnesium sulphate

and one ounce of turpentine and give as drench, and if bowels do not move freely repeat in twelve hours.

Also give, every hour, nux vomica, one dram, fluid extract digitalis, ten minims, and fluid extract aconite, ten minims.

Until the fever is reduced feed lightly on bran, oats and alfalfa.

S. H. GALLIER.

Treatment for "Sweeney"

I am a reader of THE AMERICAN JOURNAL OF VETERINARY MEDICINE and find it very interesting and helpful. If not asking you too much, will you tell me what you consider the most successful method of treating muscular atrophy or sweeney of the shoulders in horses?

L. D. WHITAKER, D. V. S.
Pearisburg, Va.

For the treatment of acute attacks of "sweeney" we have found nothing superior, or in fact nothing else quite equal to a liniment composed of the following:

Tincture of iodine, 3 parts.

Gombault's caustic balsam,* 1 part.

Apply with thorough rubbing. One or two applications are sufficient to cure the severest cases when applied early in the attack. This will not blister if a small amount be used and thoroughly rubbed into the skin.

For the old chronic cases where the lameness has disappeared or nearly so, perhaps nothing else is superior to one dram of turpentine to seven drams of sweet oil, thoroughly mixed and given hypodermically in four or five locations where the atrophy is worst.

This application is often very painful and it is necessary to give the horse some sort of anodyne and keep him under the effects of it for several hours after giving the injection. Chloral hydrate makes a good anodyne for this purpose, as does also H-M-C.

*You can make a very similar product quite cheaply; for the formula see in the October issue.

Bacterins and Nuclein for Fistulous Withers

On May 10, 1911, I was called to see an eight-year-old, 1,300-pound bay mare, with a case of fistulous withers, of four months' standing. One week before she was pronounced cured by a so-called "horse doctor." I told the owner it is a wonder she was alive.

I commenced treatment by giving one ampule of Poly-Bacterins (Abbott) hypodermically and giving a thorough surgical dressing, and then one ampule of Poly-bacterins every five days until five doses had been given; then two ampules every seven days until three doses had been given. After the first twenty days I gave six Cc. of nuclein solution daily for ten days, and thereafter ten Cc. of nuclein solution daily for fifteen days. June 21st, the owner put her to light work.

I used or applied no local treatment after the first surgical dressing, as I have experienced on previous cases that the local dressing continued daily has a tendency

to remove the opsonized serum and delay recovery.

JAMES B. HUNT.

Martelle, Ia.

"Recurrent" Parturient Paresis

A very unusual case of parturient paresis that came under my observation while practising in Lebanon, Indiana, in 1910.

On the evening of September 26, 1910, I was called to see a cow and found her lying stretched full length on her side, unconscious, and suffering from a severe attack of parturient paresis. She had delivered a calf the night before and was all right up till noon of the following day.

The cow was without doubt in a dying condition. She was lying flat on her side and profoundly unconscious, as pricking with a needle or touching eyeball with the finger brought no evidence of life. Respiration five or six per minute, and sonorous. Expiration was accomplished by blowing through mouth, causing cheeks to puff out with each expiration; the pulse was twenty to twenty-five per minute. Temperature 97.4° F.

Treatment.—I gave a hypodermic injection of one-half grain of strychnine and one-tenth grain of glonoin, and inflated the udder; drew the urine and propped patient up on her sternum. She improved much in an hour and began to regain consciousness. I drew some of air from udder and again inflated it tightly, and gave another one-half grain of strychnine and one-tenth grain of glonoin. The patient got up in six hours and was able to walk. She drank about two gallons of water and ate heartily of some hay. I gave her one and one-half pounds of epsom salt and one and one-half grains of arecoline and left her, instructing the owner to feed her lightly, and give her plenty of fresh cold water to drink.

On September 27th, I was again called to see this cow and found her down and in a semiconscious condition. I again inflated udder and gave a hypodermic of glonoin one-tenth grain and arecoline one grain as bowels had not moved. The owner stated she had eaten a little grass and drank sparingly of water. She got up in about three hours and drank considerable water. I then gave one pound of epsom salt and told the owner not to feed her anything that day and also not to milk her until the next day.

September 28th, the patient was again down and in a comatose condition. I repeated same treatment as before and patient was on her feet again in two hours. Bowels had not yet moved. She urinated all right. I left some fluid extract nux vomica and instructed owner to give a tablespoonful every four hours.

September 29th. The patient again down although not so bad as before. I repeated treatment as before and she got on her feet in a short time. Her owner stated bowels moved slightly day before and the passage was hard, dry and black. I administered stimulants of aromatic spirit of ammonia and nitrous ether and nux vomica; applied a blister to loins and left

nux vomica to be given three times daily. The bowels began to act freely, that evening cow seemed to be doing fine, ate and drank heartily.

September 30th. My client came into the office and stated that the cow was again down but would eat and drink. I had to attend another call so gave him stimulants to administer and did not hear from him again for several days.

October 6th, he came in to settle and he said cow got up all right and seemed apparently well for two days when she again went down and died.

Has anyone had a similar case? Can anyone give me an explanation of why this cow went down so many times?

EDGAR HEINY, V. M. D.
Hattiesburg, Miss.

Animals Tried in Court as Criminals

The *St. James Gazette*, in a recent issue, relates that a woman living in Etampes, near Paris, was counting her money as she walked along the street and dropped a note of 40 pounds. The bill fluttered to the ground and was picked up by a goatherd who was passing with a herd of she-goats. As the goatherd was about to hand the bill to its owner, a goat grabbed it and immediately ate it.

The woman accused the goatherd of having purposely fed her money to the animal, and called an officer. The man and goat were arrested and taken before a magistrate. To prove his honesty, the goatherd offered to sacrifice the goat. The animal was killed and the banknote was recovered, somewhat damaged, but with the number intact so that the woman was enabled to exchange it. The goatherd then demanded that the woman pay for the goat, which she refused to do. The case is still in the courts.

This is not the first time that an animal has been hailed to the bar of justice in France. Herbert Spencer, in his Descriptive Sociology, quotes Du Boys as relating several instances of the prosecution of animals for crimes of one sort or another. It is stated that a cow was executed with all due ceremony, after conviction for a capital offense in 1546. Insects which ravaged a village were tried before an ecclesiastical tribunal in due form in 1587. Counsel was granted them and several months passed in the usual memoirs, pleadings and delays. They were finally condemned.

Berriat Saint-Prix enumerated more than eighty cases of sentences of death or excommunication pronounced against animals, ranging from an ass to a grasshopper, between 1120 and 1741. A sow which had killed and eaten a child was tried, mutilated and executed in 1356, after having been dressed in men's clothes. During the same century three swine and a pig were condemned to be burned, felled or buried, for having eaten a young shepherd. The rest of the herd were condemned as accomplices and their sentences were only remitted upon appeal to the duke of Burgundy.

That the ancients ascribed reasoning powers to animals, we know because we are told in the Bible that the serpent was condemned to "go upon his belly" because he tempted Eve.

In the Middle Ages this belief was very general. The ancient Irish are reported to have had such a veneration for wolves that they chose them as godfathers for their children.—*Humane Advocate.*

W. A. Robertson, a veterinary surgeon now employed here as Government horse and cattle inspector, has decided to locate in Lander and will practice his profession. He is a graduate of one of the best veterinary schools and comes here highly recommended.

—*Jacksonville* (Ill.) *Journal.*

At the American Veterinary Medical Association's annual meeting in Toronto, Canada, August 22-25. Dr. J. H. Blattenberg, of Lima, gave three separate lectures, on timely subjects connected with the work of the society and practical side of the profession.

—*Spencerville* (Ohio) *Journal News.*

Dr. J. H. Bower recently received an appointment from the Government whereby he was named as one of the veterinarians to go to the Philippine Islands and work for Uncle Sam at a salary of $1,600 a year. His commission was to take effect immediately. This is quite a feather in Dr. Bower's cap. He, with a number of

others, took the examination for this position and of course feels quite elated that he should be chosen for the place. But best of all, the doctor has located here and says he intends to remain with us and that the Government will have to get some one else to look after their sick animals in that far-off land, as he prefers Elgin to the Philippines.

—*Elgin* (Ill.) *Echo.*

Rheumatism in Pigs

Rheumatism is commonly caused by allowing hogs to sleep in damp, filthy and improperly ventilated quarters. The system of ventilation should be such that there will be no direct currents of air striking the animals. The sun should have free access to the houses at all times. This will keep the sleeping quarters in a dry, sanitary condition.

—*Vincennes* (Ind.) *Sun.*

Typhoid Vaccine

In his address before the Philadelphia Medical Club President Taft said:

"Now we have a division of 18,000 men in Texas and California. They have been there for two months living under canvas and in a country soaked with rain. * * * I need not recall the dreadful record of sickness from typhoid fever in the camps at Chickamauga. * * * Of the volunteer regiments mobilized during the Spanish-American war, 90 percent (about 16 percent of the men) became infected with typhoid fever within eight weeks after the date of mobilization. Today, two months after mobilization, with the modern health regulations and by the use of vaccine against typhoid, not one case of typhoid has appeared in the entire force, except that of one teamster who was not vaccinated."

This will be interesting news not only to the medical profession but to the laity, which has learned at last that the terrors of the battlefield are not greater than the horrors of the camp.

—*Chicago Tribune.*

No "Secrets" in Medicine

Any owner of live stock who has been so foolish as to buy any of the so-called stock foods, condition powders or tonic powders sold on the market, should send for the supplement to the January, 1911, Bulletin of the North Carolina State Department of Agriculture, Raleigh, N. C.

After all the unanswered and unanswerable facts which have been published, exposing these frauds, it is impossible to understand how any self-respecting paper can get its consent to carry advertisements of them; or why any farmer will be so foolish as to throw away his hard-earned money on this worthless, or worse than worthless, trash.

Public sentiment first forced whiskey advertisements out of the better class of papers or journals; then it took another step in advance and forced advertisements of patent medicines for man out of the high-class publications; and the time can not fail to come soon when the sentiment of their readers will force the agricultural papers to purge their columns of the advertisements of patent medicines for live stock. If patent medicines are harmful to man, they are also harmful to his farm animals, and the day is not far distant when public opinion will put the same estimate on both classes of frauds. The *Progressive Farmer* draws the line on secret medicines, and this is the only safe or honest place to draw it.

There are no secrets in medicine, and anyone who seeks to make it appear as if there were, convicts himself of either ignorance or a desire to deceive or defraud the public.—DR. TAIT BUTLER, in *The Progressive Farmer and Farm Gazette*, Clarksville, Miss.

City Exposes "Baby Killers"

The Chicago Board of Health has issued an appeal to mothers directed against the use of soothing sirups condemned by the Department of Agriculture.

"Are you making a drug fiend of your baby?" asks the bulletin. "Many of the best known soothing sirups are soothing only because they contain dope. There are numerous cases where the baby has been put to sleep never to awake."

Under the caption, "Beware of These Baby Killers," the department lists the following:

Children's Comfort (morphine).

Dr. Fahey's Pepsin Anodyne Compound (morphine).

Dr. Fahrney's Teething Sirup (morphine and chloroform).

Dr. Fowler's Strawberry and Peppermint Mixture (morphine).

Dr. Groves' Anodyne for Infants (morphine).

Hooper's Anodyne, the Infant's Friend (morphine).

Jadway's Elixir for Infants (codein).

Dr. James' Soothing Sirup Cordial (heroin).

Kopp's Baby's Friend (morphine).

Dr. Miller's Anodyne for Babies (morphine and chloral hydrate).

Dr. Moffatt's Teethina, Teething Powders (powdered opium).

Victor Infant Relief (chloroform and cannabis indica).

Mrs. Winslow's Soothing Sirup (morphine).

"In some instances in which soothing sirup are freely used and the child does not succumb there is developed a case of infant drug addiction," continues the appeal. "As soon as the effects of one dose passes away the child becomes irritable and fretful, with the result that another dose is given, the craving is met, and the child is quieted—a condition which is analogous in every respect to drug addiction among adults.

"Sometimes these children look plump and healthy, but as a matter of fact their flesh is soft and flabby and they withstand attacks of illness poorly."

—*Chicago Tribune.*

The crusade for the sale of pure milk in Campbell County is on with a vengeance, and County Health Officer Shaw has notified all dairymen in the county that their cows will soon be subjected to the tuberculin test.

Sheriff Imfield has served the written notices upon the dairymen. The work will be done under the supervision of the State and County health departments. All cows found to be suffering with the disease or showing any of the symptoms, will be destroyed at the owner's expense.—*Commercial Tribune,*

In a bulletin issued by the State Board of Health attention was called to the necessity of muzzling dogs, and the method of handling cases of rabies of dogs suspected of being afflicted with the disease. Among the statistical information given in this bulletin we find:

"Nearly all animals are susceptible to rabies. About 80 percent of the cases occur in dogs, about 15 percent in cattle. Wolves, skunks, cats and other mammals are occasionally infected.

"Over 90 percent of all the cases of rabies result from being bitten by dogs. It is heretofore of the highest importance that the muzzling of dogs be enforced. In Great Britain the number of cases of rabies in 1889 was 312, at which time muzzling began to be enforced. In 1892 the number of cases had been reduced to 38 and the muzzling ordinance which had met with a great deal of opposition was relaxed. After this time the number of cases rapidly increased to 672 in 1895, after which muzzling was again enforced and the number of cases was reduced to none in 1900. Let us profit by the experience of Great Britain and remove this terrible affliction from our midst. When animals cannot bite they cannot communicate the disease and the contagion of rabies will die with the dying of the last infected.

—*Lansing* (Mich.) *Journal.*

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